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December 1, 1998

**BOX: PATENT APPLICATION**

Assistant Commissioner for Patents  
Washington, D.C. 20231

Re: Application of Jiangtao WEN, John D. VILLASENOR and Jeong-hoon PARK  
**METHOD FOR REPRESENTING ENCODING UPON CODING VIDEO INFORMATION**  
Our Reference: Q48591

Dear Sir:

Attached hereto is the application identified above including the specification, claims, one (1) sheet of drawings. The requisite U.S. Government Filing Fee, executed Declaration and Power of Attorney and Assignment will be submitted at a later date.

The Government filing fee is calculated as follows:

Total Claims	7 - 20 =	0 x \$18 =	\$ 000.00
Independent Claims	1 - 3 =	0 x \$78 =	\$ 000.00
Base Filing Fee	(\$760.00)		\$ 760.00
Multiple Dep. Claim Fee	(\$260.00)		\$ 000.00
<b>TOTAL FILING FEE</b>			<b>\$ 760.00</b>

Priority/Benefit is claimed from:

**U.S. Patent Application**

60/067,014

**Filing Date**

December 1, 1997

Respectfully submitted,  
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DM:tnj

**METHOD FOR REPRESENTING ENCODING  
UPON CODING VIDEO INFORMATION**

**Cross Reference to Related Applications**

This application is an application filed under 35 U.S.C. § 111(a), claiming benefit pursuant to 35 U.S.C. § 119(e)(1) of the filing date of the Provisional Application, No. 60/067,014, filed December 1, 1997, pursuant to 35 U.S.C. § 111(b).

**BACKGROUND OF THE INVENTION**

**1. Field of the Invention**

The present invention relates to a method for coding video information, and more particularly, to a method which represents that the video information has been encoding or non-encoding according to certain parameters by extending a video information field. Furthermore, the present invention relates to a method of reducing the amount of video bits, by which a method of representing encoding or non-encoding by the extension of an information field for representing encoding or non-encoding can be applied to an error allowable mode, and by which the amount of bits depending on the characteristics of video information to be coded can be reduced.

**2. Description of Related Art**

In the case of a block-based codec, an object-based codec, or a shape-based codec, a general technique for encoding a moving picture is as follows. A motion vector designates a block of a previous frame which is most similar to a current block, and a real value or a modified value (e.g., DCT) with respect to the difference between real data of the current and previous blocks are encoded to produce

data, so that a block is encoded.

In H.263 and MPEG-4, a "COD (code)" field is used to designate whether a motion vector and a DCT are encoded in the bit stream.

5        FIG. 1 is a conceptual view showing a method of representing encoding and non-encoding in a general bit stream.

As shown in FIG. 1, whether a motion vector MV and a DCT coefficient are encoded or not is represented by a one-bit value of a COD field. That is, if the bit of the COD field is "0", it indicates that the MV and the DCT are encoded, but if the bit thereof is "1", it indicates that they are not encoded.

10       However, when the encoding or non-encoding of a block is designated by using the COD field, this information is represented by only one bit. Thus, in some cases when this one bit is used in a channel having an error, the entire information is easily misinterpreted due to only the error of one bit.

15       Also, in the case of an image motion on a predetermined background, only the motion vector (MV) is required during actual encoding and the difference value (DCT) is not needed. In the conventional technique, the difference value (DCT) is also encoded to thereby cause an increase in the amount of bits.

#### SUMMARY OF THE INVENTION

An object of the present invention is to provide a method

of representing encoding upon encoding video information, by which misinterpretation can be prevented when video information is transmitted in a channel with an error by extending a "COD" field used in a bit stream.

5 Another object of the present invention is to provide a method of representing encoding upon encoding video information, by which data, obtained by encoding the motion of an image in a smaller amount than in the conventional art with respect to constant video motion information, is generated by extending the "COD" field used in a bit stream.

10 According to the present invention, there is provided a method for representing encoding when video information is coded, characterized in that an image is encoded by extending a code (COD) field to indicate the cases where neither a motion vector (MV) nor a discrete cosine transform (DCT) value are encoded, where both the MV and the DCT value are encoded, and where only the MV is encoded.

15 Preferably, the extended code field comprises at least two bits.

20 Preferably, the extended code field is used in H.263 or MPEG-4 encoding standards.

25 Preferably, when the COD field has a bit value of "11", it indicates that neither the MV nor the DCT value are encoded, when the COD field has a bit value of "00", it indicates that both the MV and the DCT are encoded, and when the COD field has a bit value of "01", it indicates that only the MV is encoded.

Preferably, when an error exists in a channel, only the

two values of "00" and "11" are used in an error allowable mode.

Preferably, when packetized data is divided and transmitted in the error allowable mode, the number of "1" of the COD field in a packet is encoded using variable length coding (VLC) and transmitted before the COD field without transmitting the original COD, and when the combined code has a bit value of "00", "0" is transmitted, and when the combined code has a bit value of "11", "1" is transmitted, and in the cases of the other combinations, the original codes of VLC and COD are transmitted without change.

Preferably, information is encoded by using only MV, when motion of an image is constant.

#### BRIEF DESCRIPTION OF THE DRAWINGS

The above objects and advantages of the present invention will become more apparent by describing in detail a preferred embodiment thereof with reference to the attached drawings in which:

FIG. 1 is a conceptual view showing a method for representing encoding and non-encoding in a general bit stream; and

FIG. 2 is a conceptual view showing a method for representing encoding and non-encoding in a bit stream according to the present invention.

#### DESCRIPTION OF THE INVENTION

As shown in FIG. 2, extending the COD field by one bit

results in a reduction of the probability of decoding erroneous COD information, and also allows for the generation of a smaller amount of data than in the conventional art with respect to an image which can sufficiently represent information by using only a motion vector. That is, the COD field represents not only the encoding or non-encoding of two representative values but also a case when only a motion vector, among the two representative values, is required. For this, the COD field is 2 bit-tabled. That is, "11" of the 2 bits indicates that neither MV nor DCT is encoded, "00" indicates that both the MV and DCT are encoded, and "01" indicates that only the MV is encoded. Here, although not specifically used in this embodiment, it can be recognized that "10" may indicate that only the DCT is encoded.

When a video codec performs encoding in an error allowable mode via this expression of the COD, only two values of "00" and "11" are used to prevent defective transmission of "01". In this way, misinterpretation is less likely to occur in a channel with errors than in the case where the COD is represented using one bit.

Also, when a segment of packetized data is divided and transmitted in the error allowable mode, the following method can be used. That is, the number "1" of the COD in a packet is encoded using variable length coding (VLC) and transmitted before the COD. Here, when the combined codes are both expressed by "00", "0" is transmitted, and when those are expressed by "11", "1" is transmitted. The original COD is not transmitted. In the residual cases, the original codes of

VLC and COD are transmitted without change. Thus, the information field of the COD is extended to be more robustly applied to the error allowable mode.

The present invention is not limited to the above-  
described embodiment, and it is apparent that modifications  
may be effected by those skilled in the art within the spirit  
of the present invention. For example, it is apparent to  
those skilled in the art that the COD field can be expressed  
by 2 bits or more in the method of representing encoding when  
coding video information. Also, determination of a channel  
with errors, and determination of whether an image moves under  
a constant background, are obvious to those skilled in the  
art, so they will not be described in detail. Here, these two  
determinations are applied to the method of representing  
encoding when coding video information.

According to the present invention as described above, in  
a channel with errors, a COD field is extended, and the  
extended COD field can be used in an error allowable mode.  
Also, video information can be encoded using a smaller amount  
of bits where an image makes a regular movement on a  
background, than in the conventional art.

WHAT IS CLAIMED IS:

1. A method of representing encoding when video information is coded, characterized in that an image is encoded by extending a code (COD) field which is used in a bit stream to indicate the cases where neither a motion vector (MV) nor a discrete cosine transform (DCT) value are encoded, where both the MV and the DCT value are encoded, and where only the MV is encoded.

2. The method as claimed in claim 1 wherein said extended code field comprises at least two bits.

3. The method as claimed in claim 2, wherein said extended code field is used in H.263 or MPEG-4 encoding standards.

4. The method of representing encoding when video information is coded as claimed in claim 3, wherein when the COD field has a bit value of "11", it indicates that neither the MV nor the DCT value are encoded, when the COD field has a bit value of "00", it indicates that both the MV and the DCT are encoded, and when the COD field has a bit value of "01", it indicates that only the MV is encoded.

5. The method of representing encoding when video information is coded as claimed in claim 4, wherein where an error exists in a channel, only the two values of "00" and "11" are used in an error allowable mode.

6. The method of representing encoding when video information is coded as claimed in claim 5, wherein when packetized data is divided and transmitted in the error allowable mode, the number of "1" of the COD field in a packet



is encoded using variable length coding (VLC) and transmitted before the COD field without transmitting the original COD and when the combined code has a bit value of "00", "0" is transmitted, and when the combined code has a bit value of "11", "1" is transmitted, and in the cases of the other combinations, the original codes of VLC and COD are transmitted without change.

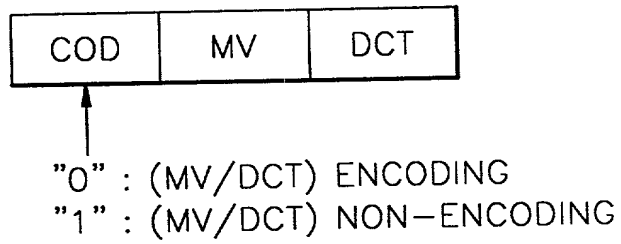
7. The method of representing encoding when video information is coded as claimed in claim 3, wherein information is encoded by using only MV, when motion of an image is constant.

# ABSTRACT

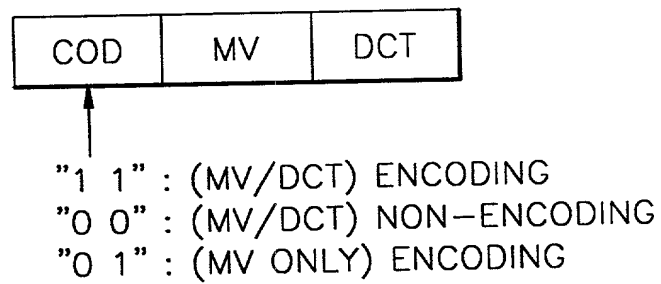
A method of representing encoding or non-encoding by extending a video information field of a block when coding video information, is provided. The method of representing encoding or non-encoding by extending an information field for representing encoding or non-encoding is applied to an error allowable mode. Also, the amount of bits depending on the characteristics of video information to be encoded can be reduced. In this method, an image is encoded by extending a code (COD) field which is used in H.263 and MPEG-4 to indicate the cases where neither a motion vector (MV) nor a discrete cosine transform (DCT) value are encoded, where both the MV and the DCT value are encoded, and where only the MV is encoded. Therefore, in a channel with errors, the extended OCD field can be used in the error allowable mode. Also, video information can be encoded using a smaller amount of bits where the motion of an image is constant, than in the conventional art.

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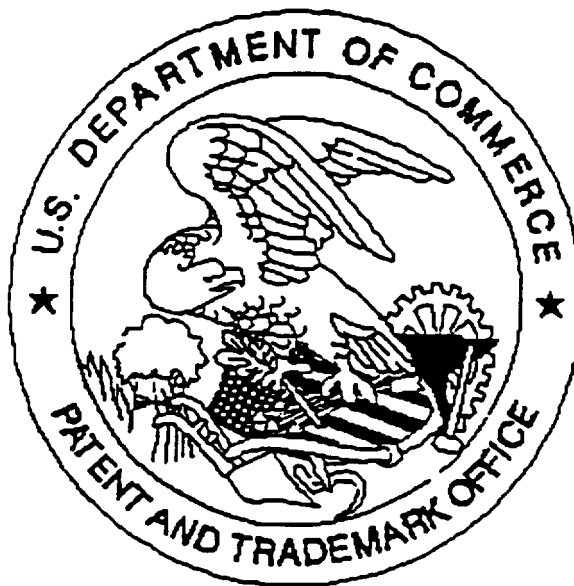
**FIG. 1 (PRIOR ART)**



**FIG. 2**



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Application deficiencies were found during scanning:

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